

## CLAIMS

1. A green pigment for a color filter which is comprised of a phthalocyanine green pigment and capable of expressing a region of xy-chromaticity coordinate enclosed by the following Equations 1, 2 and 3 defined by the XYZ color system of the CIE when the green pigment is solely subjected to colorimetry using a F10 light source:

(Equation 1)

$$y = 2.640 \times x + 0.080$$

wherein a range of "x" in the Equation 1 is  $0.180 < x < 0.230$

(Equation 2)

$$y = 5261.500 \times x^4 - 6338.700 \times x^3 + 2870.400 \times x^2 - 580.730 \times x + 44.810$$

wherein a range of "x" in the Equation 2 is  $0.230 < x < 0.350$

(Equation 3)

$$y = -36.379 \times x^3 + 37.410 \times x^2 - 13.062 \times x + 1.907$$

wherein a range of "x" in the Equation 3 is  $0.180 < x < 0.350$ .

2. The green pigment for a color filter according to Claim 1 wherein the phthalocyanine green pigment has a wavelength (Tmax) within a range of 500 to 520 nm at which a maximum transmittance in a spectrum of a spectral transmittance between 380 and 780 nm is provided.

3. The green pigment for a color filter according to Claim 1 or 2 wherein the phthalocyanine green pigment is a brominated zinc phthalocyanine.

4. The green pigment for a color filter according to Claim 3 wherein the brominated zinc phthalocyanine contains less than 13 bromines on average per one molecule.

5. A green pigment dispersion for a color filter comprising the brominated zinc phthalocyanine according to Claim 3 or 4 which has a mean primary particle size within 0.01 to 0.1  $\mu$  m.

6. A photosensitive color composition for a color filter comprising a reactive substance involving a curing reaction and one or more coloring substances including the green pigment for a color filter according to any one of Claims 1 to 4.

7. The photosensitive color composition for a color filter according to Claim 6 wherein the green pigment for a color filter is included at a proportion more than 30 % by weight of the coloring substance.

8. The photosensitive color composition for a color filter according to Claim 6 or 7 wherein the green pigment for a color filter is included at a proportion more than 50 % by weight based on a total amount of green pigments in the coloring substance.

9. A photosensitive color composition for a color filter comprising a reactive substance involving a curing reaction and

a coloring substance including a first and a second green pigments, wherein the first green pigment is one selected from the group consisting of green pigments for a color filter each of which is comprised of a phthalocyanine green pigment and capable of expressing a region of xy-chromaticity coordinate enclosed by the following Equations 1, 2 and 3 defined by the XYZ color system of the CIE when the green pigment is solely subjected to colorimetry using a F10 light source, and wherein the second green pigment is one selected from the group consisting of green pigments for a color filter each of which is comprised of a phthalocyanine green pigment and capable of expressing a region of xy-chromaticity coordinate enclosed by the following Equations 4, 5 and 6 defined by the XYZ color system of the CIE when the green pigment is solely subjected to colorimetry using a F10 light source:

(Equation 1)

$$y = 2.640 \times x + 0.080$$

wherein a range of "x" in the Equation 1 is  $0.180 < x < 0.230$

(Equation 2)

$$y = 5261.500 \times x^4 - 6338.700 \times x^3 + 2870.400 \times x^2 - 580.730 \times x + 44.810$$

wherein a range of "x" in the Equation 2 is  $0.230 < x < 0.350$

(Equation 3)

$$y = -36.379 \times x^3 + 37.410 \times x^2 - 13.062 \times x + 1.907$$

wherein a range of "x" in the Equation 3 is  $0.180 < x < 0.350$

(Equation 4)

$$y = 8.000 \times x - 1.513$$

wherein a range of "x" in the Equation 4 is  $0.260 < x < 0.270$

(Equation 5)

$$y = -1051.300 \times x^4 + 1176.900 \times x^3 - 450.880 \times x^2 + 62.131 \times x - 0.836$$

wherein a range of "x" in the Equation 5 is  $0.260 < x < 0.350$

(Equation 6)

$$y = 5746.700 \times x^4 - 7310.300 \times x^3 + 3493.200 \times x^2 - 744.610 \times x + 60.251$$

wherein a range of "x" in the Equation 6 is  $0.270 < x < 0.350$ .

10. The photosensitive color composition for a color filter according to Claim 9 wherein the first green pigment has a wavelength(Tmax) within a range of 500 to 520 nm at which a maximum transmittance in a spectrum of a spectral transmittance between 380 and 780 nm is provided, and wherein the second green pigment has a wavelength(Tmax) within a range of 520 to 535 nm at which a maximum transmittance in a spectrum of a spectral transmittance between 380 and 780 nm is provided.

11. The photosensitive color composition for a color filter according to Claim 9 or 10 wherein a central metal of the phthalocyanine green pigment in the first green pigment is the same as that in the second green pigment.

12. The photosensitive color composition for a color filter according to any one of Claims 9 to 11 wherein the first green pigment and the second green pigment are brominated zinc

phthalocyanines.

13. The photosensitive color composition for a color filter according to Claim 12 wherein the brominated zinc phthalocyanine of the first green pigment contains less than 13 bromines on average per one molecule, and wherein the brominated zinc phthalocyanine of the second green pigment contains 13 or more bromines on average per one molecule.

14. The photosensitive color composition for a color filter according to Claim 12 or 13 wherein each of the brominated zinc phthalocyanines has a mean primary particle size within 0.01 to 0.1  $\mu\text{m}$ .

15. The photosensitive color composition for a color filter according to any one of Claims 6 or 14 wherein a weight ratio (b/a) of a non reactive substance (b) other than the coloring substance to the reactive substance (a) is 0.45 or less.

16. The photosensitive color composition for a color filter according to any one of Claims 6 or 15 wherein a ratio expressed by pigment/vehicle is in a range of 0.25 to 1.0.

17. The photosensitive color composition for a color filter according to any one of Claims 6 or 16 wherein at least one yellow pigment is further contained as the coloring substance.

18. The photosensitive color composition for a color filter according to any one of Claims 6 or 17 wherein a green pigment including the green pigment for a color filter and the yellow pigment are contained at 1.6 or less in a weight ratio (yellow pigment/green pigment) of the yellow pigment to the green pigment.

19. A color filter provided with a green pixel comprising one or more pigments including the green pigment for a color filter according to any one of Claims 1 to 4.

20. A color filter provided with a green pixel which is formed using the photosensitive color composition for a color filter according to any one of Claims 6 to 18.

21. The color filter according to Claim 19 or 20 wherein the green pixel has a thickness of  $2.7 \mu\text{m}$  or less and is capable of expressing a color space ranging  $0.21 \leq x \leq 0.30$  in a x-coordinate,  $0.55 \leq y \leq 0.71$  in a y-coordinate and  $29 \leq Y$  in a stimulus value "Y" defined by the XYZ color system of the CIE when the green pixel is solely subjected to colorimetry using a F10 light source.

22. The color filter according to Claim 19 or 20 wherein the green pixel comprising the green pigment for a color filter further contains at least a yellow pigment at 1.6 or less in a weight ratio (yellow pigment/green pigment) of the yellow pigment to the green pigment for a color filter, and is capable of expressing

a region of xy-chromaticity coordinate ranging  $0.21 \leq x \leq 0.30$  in a x-coordinate and  $0.55 \leq y \leq 0.71$  in a y-coordinate defined by the XYZ color system of the CIE when the green pixel is solely subjected to colorimetry using a F10 light source.

23. A color filter provided with a green pixel which is formed using a photosensitive color composition for a color filter comprising a reactive substance involving a curing reaction and a coloring substance including a first and a second green pigments, wherein the first green pigment is one selected from the group consisting of green pigments for a color filter each of which is comprised of a phthalocyanine green pigment and capable of expressing a region of xy-chromaticity coordinate enclosed by the following Equations 1, 2 and 3 defined by the XYZ color system of the CIE when the green pigment is solely subjected to colorimetry using a F10 light source, and wherein the second green pigment is one selected from the group consisting of green pigments for a color filter each of which is comprised of a phthalocyanine green pigment and capable of expressing a region of xy-chromaticity coordinate enclosed by the following Equations 4, 5 and 6 defined by the XYZ color system of the CIE when the green pigment is solely subjected to colorimetry using a F10 light source:

(Equation 1)

$$y = 2.640 X x + 0.080$$

wherein a range of "x" in the Equation 1 is  $0.180 < x < 0.230$

(Equation 2)

$$y = 5261.500 \times x^4 - 6338.700 \times x^3 + 2870.400 \times x^2 - 580.730 \times x + 44.810$$

wherein a range of "x" in the Equation 2 is  $0.230 < x < 0.350$

(Equation 3)

$$y = -36.379 \times x^3 + 37.410 \times x^2 - 13.062 \times x + 1.907$$

wherein a range of "x" in the Equation 3 is  $0.180 < x < 0.350$

(Equation 4)

$$y = 8.000 \times x - 1.513$$

wherein a range of "x" in the Equation 4 is  $0.260 < x < 0.270$

(Equation 5)

$$y = -1051.300 \times x^4 + 1176.900 \times x^3 - 450.880 \times x^2 + 62.131 \times x - 0.836$$

wherein a range of "x" in the Equation 5 is  $0.260 < x < 0.350$

(Equation 6)

$$y = 5746.700 \times x^4 - 7310.300 \times x^3 + 3493.200 \times x^2 - 744.610 \times x + 60.251$$

wherein a range of "x" in the Equation 6 is  $0.270 < x < 0.350$ .

24. The color filter according to Claim 23 wherein the green pixel has a thickness of  $2.5 \mu\text{m}$  or less and is capable of expressing a color space ranging  $0.25 \leq x \leq 0.32$  in a x-coordinate,  $0.55 \leq y \leq 0.75$  in a y-coordinate and  $30 \leq Y$  in a stimulus value "Y" defined by the XYZ color system of the CIE.

25. The color filter according to Claim 23 wherein the green pixel contains a green pigment including the first and the second green pigments and a yellow pigment at 1.6 or less in a weight



ratio (yellow pigment/green pigment) of the yellow pigment to the green pigment, and is capable of expressing a region of xy-chromaticity coordinate ranging  $0.25 \leq x \leq 0.32$  in a x-coordinate and  $0.55 \leq y \leq 0.75$  in a y-coordinate defined by the XYZ color system of the CIE when the green pixel is solely subjected to colorimetry using a F10 light source.

26. The color filter according to any one of Claims 19 to 25 wherein the green pixel has  $500 \text{ N/mm}^2$  or more of hardness or 20 % or more of elastic deformation.

27. The color filter according to any one of Claims 19 to 26 wherein a section obtained from the green pixel has an upper edge and a bottom edge with a ratio in length of an upper edge to a bottom edge being less than 1.

28. A liquid crystal panel wherein the color filter according to any one of Claims 19 to 27 and a substrate as a side driving liquid crystal is disposed by facing them to each other, and a liquid crystal is sealed in a gap between them.